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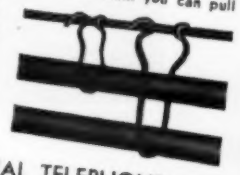

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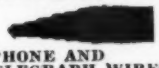

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ELECTRONIC DEVICES

In Telephony

By ARTHUR L. ALBERT
Professor of Communication Engineering, Oregon State College

***POWER AMPLIFIERS** and how the power output can be computed are discussed in this sixth article of a series on electronics and electronic devices used in telephone work. Voltage amplifiers were described in the August 26 issue, and the next article will cover modulators*

AS MENTIONED in the previous articles, there are two fundamental types of amplifiers: voltage amplifiers and power amplifiers. Voltage amplifiers are used to amplify the weak signal voltages impressed across them until these voltages are of sufficient magnitudes to control the output of power tubes. These tubes supply the actual power required to drive loudspeakers or other power-consuming devices.

The preceding article (TELEPHONY of August 26) discussed voltage amplifiers and gave equations by which the voltage amplification could be computed. This article will consider power amplifiers, and will explain how the power output can be computed.

Types of Power Amplifiers

Many types of power amplifiers have been developed for use in telephone systems, sound-amplifying systems, radio-transmitting sets, and radio-receiving sets. Of these, only several types are of much practical interest to telephone people. These power amplifiers are: The single triode class A power amplifier, the triode push-pull class A amplifier, and the class A power-output pentode.

In the single tube class A amplifier, the tube operates essentially as the triode voltage amplifier considered in the preceding article. It is biased to operate on the straight portion of the grid voltage-plate current *dynamic* characteristic curve; that is, the curve determined with a resistance load in the plate circuit.

In the class B power amplifier, the tube is biased to cut-off; two tubes are used, one passing current for one-half the cycle and the other for the other half. Class B amplifiers are used in sound systems, and in radio-transmitting sets.

The class C amplifier is a very special type suitable only for radio-frequency work. Since the class B and the class C amplifiers are of relatively little importance in telephony, they will not be considered further.

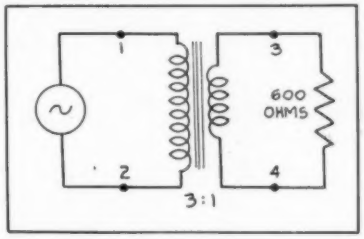


Fig. 1. An ideal transformer of 3 to 1 turns ratio will cause a load resistor of 600 ohms connected to the secondary to appear like 5,400 ohms connected between points 1-2.

Transformer-Coupled Loads

Before proceeding with the discussion of amplifiers, it is advisable to review the theory of the transformer, because this device usually connects a vacuum-tube power amplifier to its associated load. The transformer will be assumed to be ideal — that is, to have no power losses within itself—and that all of the primary magnetic flux links the secondary; that is, the coupling is perfect.

Such an ideal transformer is shown in Fig. 1. It is assumed that the transformer has three primary turns to one secondary turn. The transformer is connected to a 600-ohm resistor, approximately representing the characteristic impedance of an open-wire telephone line. The question is: What does this 600-ohm resistor appear to be when measured (or viewed) from the input terminals of the *ideal* transformer? In other words, what value would an impedance bridge measure when connected across terminals 1-2?

Making a few assumptions (justifiable for an ideal transformer), if a voltage of 30 volts is connected across the primary terminals 1-2, it will appear as a reduced voltage $E_p/3=10$ volts across the secondary. The *secondary* current will then be (again assuming ideal conditions) $10/600=0.0167$ ampere.

The current in the *primary* must be $0.0167/3=0.00556$ ampere, because assuming no losses in the ideal transformer, the *power* in the primary and secondary must be the same. Then the impedance as viewed from the primary terminals 1-2 is $Z=E/I=30/0.00556=5{,}400$ ohms.

Thus, the transformer of 3:1 turns ratio causes the 600-ohm resistor to appear like a 5,400-ohm resistor connected directly across terminals 1-2.

The ratio of these resistances is $5{,}400/600=9$, and this is the square of the transformer turns ratio. It can be concluded, therefore, that an *ideal* transformer changes resistances as the square of the turns ratio; and this conclusion holds quite closely for good communication transformers with iron, silicon steel, or permalloy cores.

These conclusions may be generalized for impedances instead of resistances if desired. Stated as an equation, $R_p=N^2R_s$, where R_p is the impedance viewed from the primary when a load resistance, R_s, is connected through a step-down trans-

former of turns ratio, N. The ratio, N, would be reversed for a step-up connection.

Power Output Calculations

The application of this theory will now be made to a power-output vacuum tube, the circuit being shown in Fig. 2-a. Note in particular that for the ideal transformer no resistance is introduced into the primary from a direct-current standpoint.

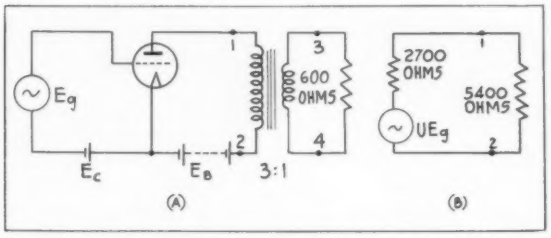


Fig. 2. Actual and equivalent circuits for a single tube operating as a class A or linear power amplifier.

This means that even with an actual transformer used in practice, essentially the entire supply voltage, E_B, appears on the plate. Since the transformer acts as an impedance-changing device, from an alternating-current standpoint, the circuit may be simplified to that of Fig. 2-b.

The tube used is assumed to have an internal plate resistance of 2,700 ohms, and an amplification factor of 4.2. It is further assumed that 7.15 volts effective value of alternating signal voltage is impressed across the grid. If the biasing voltage, E_c, is such that the tube operates on the center of its *dynamic* characteristic curve (see next section), then it operates as a linear class A amplifier, and the voltage impressed on the simplified circuit is μE_g or $4.2 \times 7.15 = 30$ volts.

The alternating current which flows in the equivalent circuit of Fig. 2 will be $30/(2{,}700+5{,}400) = 0.0037$ ampere. The power delivered to the 5,400-ohm resistor will be I^2R or $(0.0037)^2 \times 5{,}400 = 0.074$ watt. This, of course, is the power which will be delivered to the 600-ohm open-wire line in Fig. 2-a if transformer losses are negligible. This may be more power than would usually be found in telephone lines but these figures serve to illustrate the point.

Dynamic Characteristic Curves

It was previously mentioned that the power-output tube should be operated at the center of its *dynamic* curve. The meaning of this term will now be explained.

The method of obtaining the static characteristic curves of a triode was explained in the second article of this series (TELEPHONY of March 4), in the explanation accompanying Fig. 4. It was also shown in the fifth article (TELEPHONY of August 26) that if an alternating signal voltage were impressed on the grid, then an alternating signal current, a replica of the impressed voltage, would flow. In Fig. 1 of the article just mentioned, this output plate current was determined graphically from this static curve.

Now, the static curve is determined with *no load* in the plate circuit, and naturally a tube is not operated without a load, because if it were no useful power would be delivered by it. Thus, in Fig. 3 of this article, if the tube were operated with no load in the plate circuit, the limits of the plate current flow would be as determined by the static curve.

But, as in Fig. 2, there is a resistance load coupled into the plate circuit by the transformer, and the alternating plate-current variations are accordingly reduced because of this increased resistance in the plate circuit. This is equivalent to saying that the tube is being operated, not on the static curve, but on a *dynamic* curve.

It is possible to determine the dynamic curve by a method similar to that used in finding the static characteristics (TELEPHONY of March 4). Thus, a tube is connected with the load resistance in the plate circuit, and with voltage from a battery on the plate. The battery is connected without a voltage divider across it, and enough cells are used to impress the proper voltage *on the plate* when the grid biasing voltage is at the correct value.

The plate voltage battery *supply* is then left at this value, and the grid voltage is varied above and below the normal value. From the resulting plate currents, the dynamic curve such as Fig. 3 is plotted. As the grid voltage approaches the zero value, the plate current will be less than with no load resistance because of the increased voltage drop in this resistance.

As the grid voltage is made greater than the normal bias value, the current will be greater than that given by the static curve because there is less drop in the load resistor, and thus there is more voltage actually reaching the plate.

Distortion in Triodes

If the dynamic curve proved to be a straight line, then the vacuum tube itself would cause no distortion and the output plate current would be an exact replica of the voltage wave impressed on the grid. Unfortunately, there is a slight bend to the dynamic curve, even over the usual operating range, and this results in second-harmonic distortion.

No attempt was made to show this bend in Fig. 3 where the dynamic curve is assumed to be a straight line. Actually, the curve is bent slightly upward. This causes the lower halves of the output current to be slightly smaller than the upper halves. When the two halves of a wave are thus distorted, they contain a second-harmonic component. Of course, other harmonics are also produced, but for single triode operation such as here being considered, the second harmonic is by far the greatest.

It is of interest to contrast the problem of power output in telephone circuits with that in other applications such as sound-amplifying systems and radio uses. In these latter uses, the desire is usually to obtain the maximum possible power out of a given tube without excessive distortion. Or, perhaps to determine the smallest sized tube which will give a specified power output without the distortion exceeding a certain per cent.

Let it be assumed that a telephone

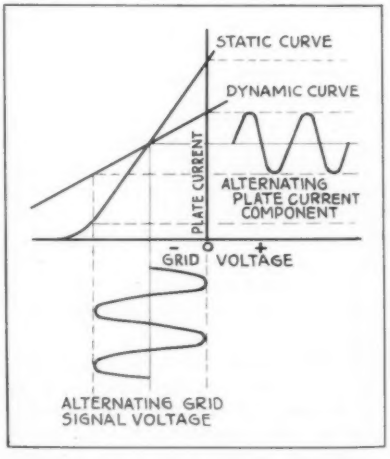


Fig. 3. If there were no load resistor in the plate circuit of the tube, then the limits of the plate current would be determined by the static curves instead of by the dynamic curve as shown.

set delivers one volt to a 600-ohm line; the power is then 0.00167 watt. Now, almost any vacuum tube will handle this small amount of power. Of course, it must be able to handle much larger peak powers. Nevertheless, it is seen by these contrasting requirements that the telephone man is ordinarily not interested in the maximum power output a tube will give.

But for the sake of completeness, a few additional words will be said about maximum power output and per cent distortion. If the dynamic curves were readily available, then these two factors could readily be determined. As a general rule, however, only the static curves are given by tube manufacturers in their manuals and specification sheets.

Methods have been developed for quickly and easily determining the maximum power output with the distortion limited to about 5 per cent. These methods are fully explained in tube manuals available at almost all

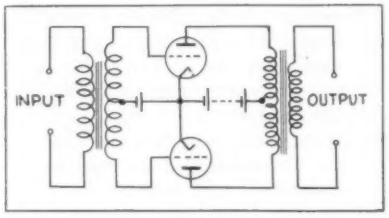


Fig. 4. A simplified push-pull circuit.

radio tube dealers. It usually works out that for maximum *undistorted* (less than 5 per cent) power, the load resistance is about twice the internal plate resistance of the tube.

Thus, in the example of power output calculations included in this article, these relations were used. Of course, in accordance with the well-known relations of maximum power output, the load resistance should equal the plate resistance. This does *not* hold, however, for maximum *undistorted* power output for a single vacuum tube as was previously stated.

Triodes in Push-Pull

In the push-pull arrangement of triode tubes is again found a circuit which is very useful and widely used in many applications, but which finds little use in telephone equipment simply because it is not necessary since the power to be handled is so small. Its interesting features, and its application in modulators (to be considered in the following article of this series), however, justify some consideration.

A simplified push-pull circuit is shown in Fig. 4. Both the input and output transformers are center tapped and the two triodes are so connected that when the grid of one tube is driven more positive, the grid of the other tube is driven more negative. Thus, the plate current in the first tube increases and the current in the second decreases.

If the analysis is carried out to completion, it can be shown that this combined action cancels out the second-harmonic distortion. Looked at from the simplest viewpoint, each tube does create a second-harmonic component because of the curvature of the dynamic characteristic. These two components are equal in magnitude, but each flows through one-half of the primary of the transformer, and since they are equal and opposite, these harmonic components induce no corresponding harmonic voltage in the transformer secondary.

The flux-producing tendencies of the desired fundamental components add together, and the two tubes in push-pull are equivalent to a fictitious single tube giving twice the output of each. Since this single fictitious tube would cause no second harmonics (at least theoretically), the theory of matched impedance can be used to match the apparent plate resistance of this fictitious tube to the load. (See article by B. T. Thompson, Proceedings of the Institute of Radio Engineers, April, 1933).

Thus, for two tubes in push-pull, the power output for a given distortion can be much greater than twice that of a single tube. The direct components of the plate currents are in opposite directions in the primary. They thus produce little magnetic flux, making smaller transformer cores satisfactory; this fact, and other desired characteristics make the push-pull circuit popular.

Power Pentodes

The suppressor-grid pentodes which were described in the third article of this series (TELEPHONY of March 25) were considered in the fifth article (TELEPHONY of August 26) as *voltage* amplifiers. Now, if the suppressor-grid pentode is properly designed, it can be used to handle considerable amounts of *power*.

This section will consider the suppressor-grid tube as a power-output pentode. The circuit of such a tube is shown in Fig. 5. In this circuit, the suppressor grid is shown connected internally to the center of the filament as was done in some of the earlier tubes. Just as for the triode, this circuit is equivalent to a generator of voltage μE_g acting in series with the plate resistance of the tube plus the load resistance reflected into the circuit by the transformer.

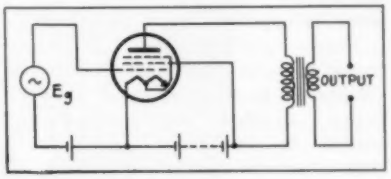


Fig. 5. Simplified circuit of a suppressor-grid power amplifying pentode. The suppressor grid is connected internally to the filament. In pentodes using an indirectly heated cathode, external connections are usually made.

Thus, the power output of the pentode can be readily determined as was done for the triode.

Before this can be done, however, the resistance coupled into the plate circuit must be known. The relation of "twice the plate resistance" holds only for a triode, and *not* for the pentode. Thus, before the circuit can be designed, the *dynamic* characteristics of the pentode (that is, the characteristics with a load in the plate circuit) must be studied.

As was previously mentioned (TELEPHONY of August 26), the suppressor-grid pentode used for power-handling purposes must be designed differently than the voltage-amplifying type. As used for voltage amplification, both the internal resistance and the amplification factor are very high.

For power output purposes both these are lower, a typical pentode having an amplification factor of 150 and a plate resistance of 60,000 ohms. If now the dynamic curves are plotted, it is found that only for comparatively low-load resistances of about 7,000 ohms (for the tube being considered) is the dynamic curve at all reasonably straight.

Thus, a low load resistance must be used with the pentode simply to prevent excessive distortion. This means that much of the generated signal power is lost within the tube itself and is not put out as useful power to the load. But, nevertheless, the power pentode is a good output tube because it has a high amplification factor and is, therefore, very sensitive. In other words, not so much voltage amplification must precede it as for the triode. The single power-output pentode has replaced push-pull triode operation in many radio-receiving sets. Little is gained

by operating power pentodes in push pull.

Summary

As has been stressed throughout these articles, amplifiers are of two types: voltage amplifiers, and power amplifiers. Voltage amplifiers were described in the preceding article.

Power amplifiers are of many types, but those of chief interest to telephone people are the class A types. In these the tubes are so biased that with the signal voltage impressed on the linear portion of the characteristic curve, very little distortion results. Some second harmonic distortion is produced, however, because the dynamic curve is not perfectly straight.

The push-pull amplifier so operates that the second harmonic distortion is cancelled. This, and other advantages give it desirable characteristics.

When the maximum power output of either a triode or pentode is to be found, their dynamic characteristic curves should be available. For given circuit conditions, the power output can be computed by simple theory.

Modulators will be discussed in the next article.

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

INITIATIVE and good judgment are necessary in handling calls. Series No. 379

OPERATING rules and practices are necessary to facilitate the handling of local and long distance calls and to render a uniform service. However, an operator must use initiative and good judgment with the instructions in order to render pleasing and satisfactory telephone service.

Where a standard operating practice is prescribed, it is advisable to follow this practice unless instructed to the contrary by the management of the company. All of the standard operating practices have been tried and proven to be the best method of handling a particular condition relating to the completion of a telephone call.

When an operator deviates from a standard, prescribed practice she may, in some instances, favor a particular subscriber, or her action may result in the completion of a long distance call; but it is well to keep in mind that in many other similar cases she creates dissatisfaction, annoys or irritates a subscriber to the extent that he will complain or criticize the service. We have a question this week, No. 4, which can very well be used as an illustration of this point.

Our Operating Practice tells us that when a customer requests an operator to hold his call for an AG (that is, until he calls in and tells her to try it) she should "hold the ticket until a request to try the call is received." The practice further states: "Do not reach the calling station and request permission to try the call on your own initiative."

It is true that when this instruction is disregarded, an operator may occasionally complete a call. On the contrary, however, the customer may be annoyed and say something like this: "Didn't I tell you to hold the call until I called you? I'm not ready to talk now." Or, he may just cancel the call.

The time to make the effort to complete a call is when a report is received, by trying to secure, or suggest, a definite time to try the call. Saying, for example, "I will call you in about twenty minutes" or, "What time shall I try your call?" Too frequently operators fail to ask the necessary questions or offer the proper suggestions which usually results in a ticket endorsed "Hold for AG."

It is well for an operator to remember that, once this endorsement "Hold for AG" has been entered on the ticket, if she carries out her operating instructions, she can make no further attempt to complete the call on her own initiative. For this reason, tickets with this endorsement frequently result in canceled calls.

As an exception to the rule of not voluntarily taking further action on a call endorsed "Hold for AG" on a call carried forward from a preceding day, the operator should reach the calling station as soon as possible after 9:00 a.m. without interfering with the handling of other calls and say, for example: "This is the long distance operator. Shall I try your call to Freeport, Ridge 2187 again today?"

If the calling party agrees but does not specify a time ask, "What time shall I try the call?" If the calling party specifies a time say, "Thank you. I will call you," unless an immediate attempt is to be made, in which case, say, "Thank you. Will you hold the line, please?" and proceed with the call. If the calling station gives any other directions, proceed as directed.

Where a standard rule has been established for a certain condition, an operator is usually safe and wise in following the standard practice unless some unusual situation arises in connection with the handling of the call which would warrant her to deviate from the prescribed practice.

Questions from Illinois Operators

1. When we are taking peg count, should we peg when the numerous inquiries come: "Where is the fire?" etc.
2. When a long distance point calls for a number and the line is busy and she says she will hold the circuit, should she remain on the line or should we ring back and report when line is not busy?
3. How long shall an operator wait for a report before signaling the distant operator again?
4. To what extent should an operator use her own initiative in making an attempt on a ticket marked "Hold for AG" or on a ticket marked "AG (date)" and no time indicated?
5. Is a call subject to tax if there is a 25-cent messenger charge and a 25-cent report charge?

The answers to these traffic questions are given on page 31.

▼ ▼

Bell System Adopts Two New Service Emblems

In order that suitable recognition may be given to the increasing number of employes who complete 40 or 45 years of service with the Bell System, two additional classes of service emblems have been adopted.

The design of the new emblems is the same as those now in use, except that 40 years of service are indicated by two diamond insets and 45 years by three diamond insets.

In the Nation's Capital

by Francis X. Welch

Special Washington, D. C., Correspondent for TELEPHONY

BATTLE IN THE special session of Congress over repeal of the arms embargo will witness some strange political alignments. . . . Some narrow distinctions between "neutrality" and "impartiality" may come up in the discussions on foreign policy

A PECULIAR set-up faces the newly-assembled Congress as it gathers in special session to consider necessary steps that must be taken to keep the United States out of the European conflict. The battle over repealing the arms embargo and over the foreign policy of the administration generally is likely to cut through party lines and Washington will witness quite a few strange political bedfellows before the session comes to a close.

The Washington setting for this momentous development is quite different from what it was in 1915 and 1916 when Congress vainly wrestled with the same problem of keeping America out of war. Indeed, the Washington line-up has shifted considerably from even a few months ago.

Take the position of American business, for example. John J. Flynn, an astute business analyst, writing in the Washington Daily News last week insisted that American business is turning a "fishy eye on possible war profits." He explains this paradox as follows:

> Business men, I discover, are full of suspicion of war profits. In the case of hides, leather, burlap, wool and other products, the price increases are due to special circumstances. In the case of sugar, grains, etc., of course business men may be counted on to take the profits when they can get them.
>
> But many business leaders are keenly aware of the fact that war profits are vanishing profits; that while a few make money which they keep and still others make money which they quickly lose, war, for the most part, as one put it, "disrupts our organization, makes constructive planning impossible," makes long-term investment impossible, kills off permanent customers in favor of transient customers, gives an illusion of prosperity which disappears the moment peace is rumored.
>
> The singular difference between conditions now and when the last war began is that then business was all for rushing after the war profits while the political administration was eager to restrain them. Now business is reluctant and suspicious, while the war urge comes from the political administration. Now we may actually see business seeking to restrain the government instead of the government seeking to restrain business.

On the other hand an equally well-known and respected columnist, Raymond Clapper, viewing the situation from a more political vantage point right here in the nation's capital, claims that business men are inconspicuously flocking in droves to the administration side of the neutrality fight. He tells us that the same chaps who were cursing the New Deal five or six months ago are now putting the heat on their own Congressmen in an effort to have them repeal the arms embargo. The underlying motive is said to be the lure of war profits.

OF COURSE, the battle over the repeal of the arms embargo is not going to be conducted ostensibly on the basis of doing something for business. That would be poor politics for both the administration and for those business men who want to see the United States free to provision and munition the belligerent powers. No, Mr. Clapper tells us that the fight will be conducted more or less on the basis of sentimental appeal for public support.

The administration will try to demonstrate that repeal of the arms embargo is not a step towards war for this country, while the opposition will try to prove that it is. Yet, underneath there will be a strong pressure from heretofore violently anti-New Deal business quarters on behalf of allowing American manufacturers to enjoy the prosperity of war contracts.

Now, this looks like a hopeless collision of viewpoints between two usually sound and conservative observers. Your correspondent has presented the matter this way to illustrate how easy it is to fall into the trap of making sweeping assumptions on the basis of partial truths.

The truth, as usual, lies somewhere in the middle. Some business men unquestionably will, as Mr. Clapper tells us, pull every conceivable string and wire to have the fences removed from the now forbidden pastures of Martian commerce. Other business men, especially those connected with businesses which are interwoven with the long range stability of American economy, realize that war profits are fool's gold, and that we should spare no effort to keep clear of any such irresistible financial undertow as carried the United States into the vortex of the last World War. In such a category unquestionably belongs the telephone industry and public utilities generally.

Of course, it would be unwise to assume from this that there is a definite split in the ranks of business

on the question of foreign policy, or that utility men have a generally strong predisposition towards the isolationist camp. As a matter of fact, there is so much confusion about what constitutes true neutrality that a good many of us, who are perfectly sure about our objectives, are completely at sea as to specific means to attain those objectives.

For example, there is the particular point about repealing the arms embargo which President Roosevelt wants Congress to decide as quickly as possible in the affirmative. Doubtless there are many business men as well as other citizens who feel that repeal is a step in the direction of foreign entanglement which we should avoid. Doubtless there are many others who are equally sincere in believing that the arms embargo, while technically impartial, works out in favor of the aggressor nations in Europe.

Still others believe that the embargo might, in any event, be repealed without necessarily bringing us any nearer to actual participation in the war than we were before. This last optimistic viewpoint is aided by the supposition that there would be quite a bit of profitable business in it for American industry, which we might as well enjoy as to let it go elsewhere.

LAUGHING TOWERS
BY SIMS and LEE
REPAIR KIT
"I DON'T FEEL SO GOOD-IM SO ON EDGE TODAY!"
OKONO TELEPHONE CO.
"THIS IS BINKO THE MAGICIAN, CALLING MR MURDOCK IN ROOM 614!"
"IT SEEMS THAT YOUR SECRETARY HAS A CRUSH ON YOU!"
TOOL KIT
"MY WIFE IS PLAYING BRIDGE THIS AFTERNOON"
"IM SORRY, BUT MR. JENKINS HAPPENS TO BE TIED UP AT THE MOMENT!"

THE ADMINISTRATION seems certain to win its point on repealing the arms embargo, although there is likely to be quite a battle over it, especially in the Senate. But it is important to remember that this is only the opening battle between the strict isolationists and the administration.

The second major battle may be brought on by an attempt to repeal the Johnson Act, which forbids the extension of government credit to debtor nations. At this writing it seems to your correspondent that the isolationists will be able to hold this fort, which would leave the score even up between the administration and its opposition.

If, in the middle ground between these two positions, the ship of state is able to sail on without interference from abroad in the form of senseless U-boat trouble from Germany, there is no reason on earth why this government of ours cannot surely enjoy at least another year of neutrality and possibly preserve that status throughout the conflict. A year is about as far as we can see ahead with any degree of clarity.

This writer's prediction is based also on the likelihood that the Roosevelt administration, notwithstanding its poorly-concealed pro-allied disposition, would hardly do anything rash before the general election in November, 1940. Before that time, however, political sentiment ought to be pretty well crystallized on the basis of popular support in this country.

Senator Vandenberg of Michigan, one of the most skillful and shrewd figures in public life, has already crossed the Rubicon and staked his political future upon the proposition that the truly neutral spirit of the American people which is now entrenched so strongly in the middle western area surrounding the Senator's home state of Michigan, will hold its own and even grow against the waves of foreign propaganda and domestic hysteria.

Other Republican presidential aspirants are not so sure about this. They have cautiously avoided being tied up with the strong isolationist views pronounced by the dean of the Republican party, Senator Borah.

In the Democratic field developments so far have been less revealing but a split is there just the same and will become more apparent as the special congressional session wears on. The bulk of the party will unquestionably be with the administration on the first test—repeal of the arms embargo. This is said to be assured as a result of Vice-President Garner's swing to the administration on this point. Senator Clark of Missouri and one or two others may be the only Democrats to be found on the side of the arms embargo when the final vote is taken.

But it is after this vote is taken that the real fight will come. You might as well prepare yourself for

(Please turn to page 31)

Many Plan Attendance

At National Convention

SALESMEN report from the field to their home offices that interest in the approaching annual convention of the Independent telephone industry—to be held at Hotel Stevens, Chicago, October 10-13—is growing rapidly. There are so many current matters upon which first-hand information is desired that many men connected with the smaller operating companies are making plans to attend the meeting to obtain the latest intelligence.

There are questions concerning the Wage-Hour Law which confront some companies. Chairman John H. Agee of the wage-hour committee of the United States Independent Telephone Association requests questions on this subject be sent to Louis Pitcher, executive vice-president of the association, 616 S. Michigan Ave., Chicago. By thus submitting questions in advance rather than asking them from the floor during the convention, more satisfactory answers will be obtained and none will be overlooked.

The discussion of Dr. David Friday, consulting economist of Washington, D. C., on "Economics of 1939" will be of particular interest to all in view of prevailing general uncertainties.

Dr. Friday has been engaged in economic research and study for many years. He commenced teaching the subject of economics at the University of Michigan in 1908 and was professor of that subject when he left in 1916 to become associated with New York University in the same department, becoming its head in 1918.

From 1919 to 1921, he was professor of political economy at the University of Michigan. He was president of the Michigan Agricultural College the following two years. Then in 1923 he became professor of political economy for the New School for Social Research in New York City. Since 1925 he has been a research and consulting economist.

Dr. Friday is familiar with the telephone industry, having been associated with it directly and indirectly in many capacities. He was a valuation expert for the Michigan Railroad Commission in 1915, a statistical adviser to the United States Treasury relative to taxes in 1918. In 1919 Dr. Friday was adviser to the United States Telephone & Telegraph Administration, taking an active part in the settlement of compensation to telephone companies after the telephone properties were returned to private operation.

He has also served in a consulting capacity in a number of telephone rate cases since 1925. Dr. Friday is, therefore, as previously suggested, familiar with various telephone problems and his discussion of our present economic status will have special application to the telephone field.

Another speaker on the general program will be Congressman Albert A. Gore, of Tennessee. In his early thirties, Mr. Gore is one of the youngest members of the House, being elected to Congress in 1938. Congressman Gore's bill exempting telephone exchanges from the Wage-Hour Act, although not brought up for action, showed his interest in the telephone industry. His maiden speech in Congress was on the 800-million-dollar housing bill and his effort was conceded to be one of the finest orations delivered during the recent session.

Reared on a farm, Mr. Gore is still a farmer but he has been a school teacher, county superintendent of education and is a member of the Tennessee Bar. While commissioner of labor in Tennessee during 1937 and 1938, he addressed the annual convention of the Tennessee Independent Telephone Association.

Another speaker at the convention's general session will be Robert M. Bruce, vice-president of the Rochester (N. Y.) Telephone Corp. Mr. Bruce has been engaged in telephone plant work since the turn of the century. His address on "Employer-Employe Relations" will undoubtedly be based upon experience and observations over the period of his telephone career with special reference to the present time and conditions.

The committee on arrangements for the annual banquet entertainment and dance of the Independent Pioneer Telephone Association of the United States has practically completed its advance work. As has been previously stated in TELEPHONY, a ticket for the Pioneer's gala occasion will be provided to each one as he registers and there will be no charge for it. It is required, however, that registration be made in person. Manufacturers, suppliers and others are underwriting the expense for that evening's festivities.

The entertainment at last year's gathering was pronounced by observers to have been the best of the many fine programs provided for the Pioneers and their friends. The committee anticipates that this year's presentation of artists and performers will be just as pleasing.

Future Depends Upon Investment of Capital

Real wages or the economic well-being of the average American has actually gone up or down with the investment of capital from the savings of thrifty people, in new and better tools to produce new wealth in larger volume at constantly lower prices to constantly broadening markets and at rising real wages to the worker.

The record of our marvelous advance in the last 150 years demonstrates beyond question that the theory of an irreconcilable class war is wholly untenable, that the fundamental interests of busy men and busy dollars are identical. Therefore, thrift must be encouraged and its savings protected in order to provide new tools to develop the endless new frontiers of the America that is yet to be.—SAMUEL B. PETTINGILL, before The Executives' Club of Chicago.

A. T. & T. Co.'s Long Lines Department Increases Income

The long lines department of the American Telephone & Telegraph Co. recorded a gain of $3,000,000 in its gross operating revenues during the first six months of 1939, with gross revenues equalling $54,974,916 against $51,102,009 for 1938. Net operating income for the period was $7,483,870 for the 1939 period as compared to $4,957,159 for the first six months of 1938.

NEW IDEAS AND SHORTCUTS

for Plant and Exchange

By RAY BLAIN

WHAT is your "pet kink" or best method of doing a certain job? Why not tell others through this new department?

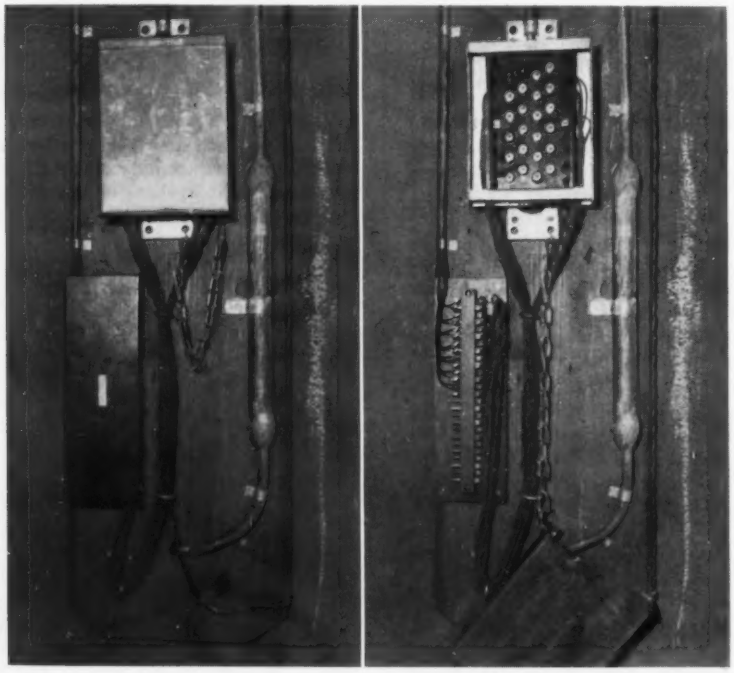
Building Cables for Telephone Distribution

Often telephone distribution lines inside large buildings can be more economically handled by the use of cable than with twisted-pair wire. The cables may be either in conduits or cleated to the walls. In modern buildings telephone conduits are usually embedded in the walls with cabinets for connecting, and outlets for telephones placed at convenient locations.

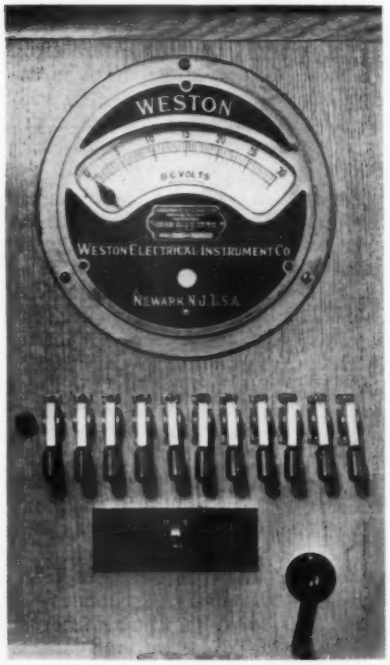
Experience has shown that these small distribution cables should not be connected direct into the main cables. To simplify splicing, the cables generally have silk-and-cotton insulated conductors in preference to paper insulation as they then may be connected direct to the terminal without the wiping of lead sleeves.

Terminals for the small cables are usually mounted near the main cable terminal and the pairs are cross-connected as desired. This arrangement provides full flexibility and does not complicate the main cable count. Ordinarily no record is kept of the pairs used in the small cables. The installer will experience no difficulty in the location of the pair he wants to use if all cable terminals are connected straight.

This arrangement has proved highly desirable for use in large buildings. It is, also, much neater than making large runs of twisted-pair wire.



Small cables with separate terminals can often be used to better advantage for local distribution inside of buildings than large runs of twisted pair wire. These two views show terminals with covers in place and removed.



The wire chief's test set must have a good voltmeter. Below the row of keys is a black key used to connect the 30 db. loss in the line. The voltage of the test battery should be kept constant for accurate testing.

Wire Chief's Test Set

The wire chief's test set is the most important single item of equipment in any telephone exchange. When this instrument is used properly it permits a more rapid clearing of trouble and makes possible large savings in time—time which would ordinarily be lost by men searching for trouble.

The most important part of the wire chief's test set is the voltmeter—and it should always be a good one. With a sensitive meter numerous valuable tests may be easily and quickly made, but the voltage of the test battery should be kept constant.

The test set consists primarily of a number of keys which connect the voltmeter, either without battery or with the test battery in series, to the line under test. The set is connected either

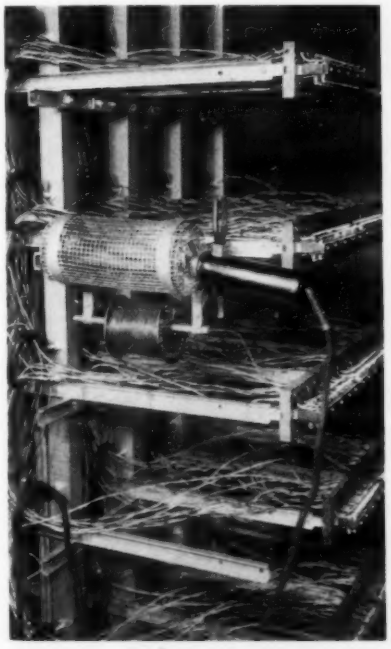
across the line or from either side to ground. The meter is connected across the line and then reversed quickly with the battery in series to indicate the capacity of the line.

Another test which is rapidly becoming popular is to connect a 30 db loss in the line under test. If a tester can talk to a subscriber or a troubleman over the line with this loss connected, he can be sure that the equipment is in a serviceable condition.

Main Frame Soldering-Iron Holder

The proper soldering of jumper wire on a main frame is most important. It is generally possible to locate a few unsoldered connections on almost all main frames. When a soldering iron is not conveniently at hand, it is easy to let a connection go with the promise that it will be soldered the next time the iron is heated. Usually when we do have a hot iron the whole affair is conveniently forgotten.

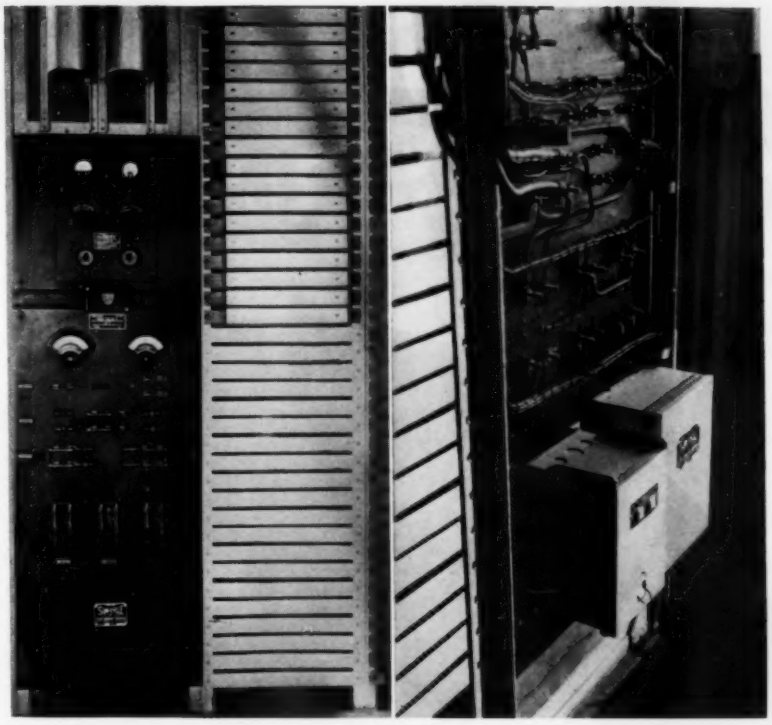
As electric soldering irons may be purchased at reasonable prices, at least one should be permanently located on each main frame so as to be available for instant use at all times. A suitable holder may be constructed out of wire netting to provide proper protection for the hot iron. A holder for a roll of resin core solder is also a most useful addition to this fixture.



A soldering iron holder on the main frame will prove a useful arrangement.

A snap switch to control the current used for heating the iron should be provided. A red pilot light will usually help to avoid leaving the iron heated for long periods of time and perhaps injuring it. This whole arrangement may be conveniently and neatly mounted on the end of the main frame.

When this system is provided there is absolutely no excuse for anyone failing to properly solder all connections on the main frame. When starting a job the switch is snapped and when the worker is ready for it, the iron will be hot. This is certainly a more convenient arrangement than looking for an iron, its holder, and a socket to which it may be connected.



Ringing machines are mounted on the power panel in this modern telephone arrangement, showing front and rear views.

Modern Telephone Power Panel

The telephone power panel has been simplified, reduced in size and, considerably improved during the past few years. The panel is often lined-up with the relay rack making a neat and indeed ideal power arrangement. The power panel may be mounted on an angle iron frame which matches up well with the average relay rack.

The rectifier may be mounted on the power panel with complete satisfaction. It was formerly thought that the rectifier must be mounted on the wall. The usual location now for the rectifier is near the top of the power panel.

Various types of ringing machines may be conveniently mounted on the modern power panel. One machine is generally arranged for operation from commercial power while the other, battery-operated, is for use in case of power failure. A relay may be provided at a small cost for the automatic change-over of these machines in case of a power failure.

This arrangement makes a serviceable and compact power unit which should prove its worth in any telephone exchange. It should be given consideration by anyone contemplating a change in the power arrangement of an exchange.

Child Uses Bell Box for Penny Bank

A telephone repairman in Piqua, Ohio, recently went to a subscriber's home in response to a request to move the bell box so that the bell could be heard more clearly. Removing the cover from the box, he was greeted by a deluge of pennies.

It then developed that Sally, the small daughter, had found great pleasure in using the bell box for a bank because she liked to hear the clink of the bell when she dropped in her pennies.

The telephone man suggested a more appropriate bank, and the subscriber found the bell loud enough where it was.

The Typ

50 Monophone

High Fidelity Transmission, Smooth-Flowing Beauty and Rugged Construction are Features of This New Wall Mounting Monophone

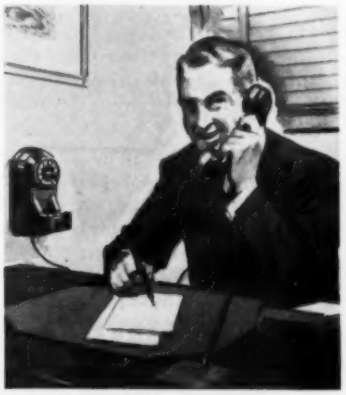
THE Type 50 Wall Mounting Monophone is a worthy running mate Type 40 Desk Monophone—characterized by the same modern refinement in the same attractive smooth-flowing lines which in the Type 40 have won the admiration of telephone men everywhere. Having the very same handset and circuit, it offers the same high transmission volume and fidelity.

Wherever wall mounting is desirable—whether in residence, business offices or industrial plants—the Type 50 Monophone offers unexcelled beauty, convenience and transmission. As with the Type 40, a choice of "Standard" or "Super-Volume" transmission is available—the latter for exceptionally long lines or severe operating conditions. Dependable chromium receiver and transmitter bands, and chromium plated dials are standard equipment at no extra cost.

Ask for samples of this new Type 50. Install them for some of your "particular" subscribers. We think you'll agree that it is the finest wall telephone, in both appearance and performance, that you have ever seen.

The Type 50 Monophone is now in production, and we are in a position to make prompt deliveries. Prices are the same as for the Type 35A5 Wall Monophone, which we shall continue to supply to those companies who prefer to continue using it as their standard wall instrument.

Here is the Type 50 equipped with number plate for manual use—quickly and easily converted for automatic operation by simply adding the dial.



Mounted on wall or side of desk in a business office, the Type 50 Monophone is out of the way, yet within convenient reach for instant action

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Central Office Maintenance

By E. K. GOSS
Division Plant Superintendent, Indiana Bell Telephone Co., Indianapolis

ROUTINES and tests, and dirt are principal items in central office maintenance work. Regular inspections by experienced employes reveal many faults which can be corrected before becoming real problems. Removal of dirt from equipment is essential. A well-planned maintenance program will result in cleaner equipment and quarters, less serious equipment troubles, and improved service without much cost. Address given before plant conference during the Indiana telephone convention

THE QUESTION of central office maintenance is one of such magnitude that it is difficult to pick out those facts and problems which might be of most interest. In going over the problems, it seemed advisable to confine the remarks of this discussion to perhaps two items which in my opinion are the most important and the ones which we all can do the most about. These items are routines and tests, and dirt.

Taking up the matter of routines, we must first admit that our central office equipment should be maintained at a sufficiently high level in order that excessive service interruptions do not occur and that we may keep our service at the highest possible standard. It has been my experience that the plant which we keep under a roof in many cases has been responsible for station visits and lengthy investigations by the outside repairmen in order to clear trouble.

By this, it is meant that there are times when a repairman may go out to adjust bells on a "bell doesn't ring" report merely because of the fact that the ringing machine in the central office is not putting out the proper ringing current. Cut-outs may be experienced by the subscriber; and we send a repairman out to check the subscriber's station apparatus for loose connection when probably the trouble is in a bad cord right under the nose of the central office repairman. This is expensive maintenance.

In order to set up an economical balance in this respect, it is necessary to make periodic routines, tests, and inspections on our central office equipment. I think the first thing to consider is inspections. In this connection, inspections, in a number of cases, provided the person making the inspection has had sufficient training to recognize faults in central office equipment either by visual inspection or tests, are a good guide as to what is needed in the way of routines.

Of course, a visual inspection will naturally bring up the second point for discussion—dirt. It may also bring up faulty workmanship, loose connections, worn cords and plugs, breakage, and so forth. If on a visual inspection notes are made as to what has been found, then routines can be set up to correct these conditions which are apparent.

Secondly, the question of frequency of routines should be considered. It has been found in a number of cases in the past that some individual set up a certain routine for the central office man to follow, not thinking that perhaps this man might be wasting a considerable amount of time in the future making this same routine, day in and day out or week in and week out, clearing absolutely no trouble merely because of the fact that he has not been checked as to the results obtained from this particular routine.

Routines should not be set up on a hit or miss basis but the frequency should be determined by the number of faults found and the number of troubles experienced on that particular piece of apparatus. It is far more economical to determine the effectiveness of the inspection tests and remedial measures applying to eliminate the faults found than it is to increase the frequency of the routines.

In order to eliminate routines being performed too frequently, it is advisable that the man performing certain routines shall make notations of the faults found as he does the routines. From these facts and by analysis of these figures, one can easily determine just what frequency should be used. This does not necessarily mean a frequency set up today would necessarily hold for all time because, as previously stated, the amount of trouble experienced is what determines the frequency, and there might be cases where the wear of certain equipment would necessarily change these frequencies as we had set them up at some particular time.

This is particularly true in older offices and also a point that must be watched carefully as new offices ex-

ARE YOU A SHIRKER OR A WORKER?

You are all familiar with the drone—the lazy bee who collects no honey, the shirker who lets the other bees do all the real work while he sees to it that he does as little as possible.

In this great apiary in which we live and work, are you a drone? Do you put into your work just as little as you can possibly "get away with?" Do you see only what is put before you to be done, or do you take a genuine interest in your work? Do you feel that what you are doing is a "daily grind" or do you take pride in accomplishing your task to the best of your ability?

Remember, you get out of life—or a job—exactly what you put into it. — CHARLES SEIDEL, Marchant Calculating Machine Co.

Wish I could find at least one user who isn't glad that he bought

Western Electric

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perience wear. For instance, if you purchased a new dial central office the manufacturer might tell you that it is not necessary to routine this equipment under two years, which might be satisfactory; but he would not make the statement that after routining the first time, you could again extend this frequency for another two years. I do not believe that would be a satisfactory set-up.

It was mentioned that one of the apparent things that might be brought out under a visual inspection is dirt. Let us consider some of the remedial measures since we have classified dirt as one of our enemies. What may we do to attempt to eliminate it?

Dirt may be divided into two classes: Old dirt and new dirt. I believe that most of you have heard of that classification before. Dirt as most people are accustomed to thinking of it as dust and smoke, in itself, is not largely responsible for our troubles. It is the lint from clothing and other fabricated materials that dirt carries or offers a resting place which causes the actual troubles.

Through a small magnifying glass a piece of lint appears to be a log between the contacts of a relay and is often very difficult to see with the naked eye. There are several methods by which old dirt may be removed from the equipment.

One of these practices which has been tried out by our company has been the use of two vacuum cleaners, one blowing the dirt out of the equipment and the other picking it up and sucking it into the cleaner, not letting it float around the equipment room to land on another piece of equipment.

Many devices have been made, expensive and non-expensive, to perform this operation. One which I think is about as good as any is to take a box, a cardboard box, and place it behind the particular bay of equipment which is being cleaned, place the sucking vacuum cleaner hose through a hole in this box, and then blow from the front of the equipment.

This is very satisfactory in cleaning out jacks and other wiring which can be blown through from the front. Wooden boxes have been made which fit on the back of the switches to catch the dirt by this blowing method.

Another method is to take a piece of silk, dampen it, and hang it in back of the equipment to catch the dirt. One thing must be remembered after a cleaning operation of this kind: It is absolutely essential that all relay contacts and any other contacts which may be in the equipment cleaned, must be burnished following this operation because the dirt that was there prior to the blowing operation has been disturbed and there are many chances that it has fallen on these contacts. In dial offices it is advisable to clean the banks after such a cleaning operation.

The walls, the framework, the racks, and the relay covers should be well painted, because it is much easier to keep dirt off of good painted surfaces than it is off of greasy, grimy walls and racks.

Use linoleum on the floors of your equipment quarters, especially in those parts where there is considerable traffic. In other words, keep your equipment and your central office quarters in a general way looking as spic and span as it is possible to do, and the chances are that your equipment itself will be just as clean. That is a small measure of handling the old dirt.

Now we can turn to the question of what we are going to do with new dirt and its elimination; and what measures we take in this respect are probably more important or as important as the removal of the old dirt. One of the first things to do is to see that your doors and windows are kept closed as much of the time as it is possible to do so.

If it is necessary to have windows open during the summer months, it is advisable to use a very fine mesh screen and to clean the screens often. If it is possible, it is advisable to seal the windows so that they can't be opened because a large amount of dirt, even though the windows are weather-stripped, will come in around the window-sills.

Opinions

By ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

"A MAN'S OPINIONS are generally of much more value than his arguments."—Holmes.

We respect people who have opinions of their own more than we do those who instead agree with, or voice the opinions of others. In the first instance, such people form their opinions after careful reflection and reasoning. In the latter case, some folks are either too lazy or timid to express an opinion of their own.

Someone has said that he admired Columbus not because he discovered a new world but rather because he had gone in search of it guided only by his deep faith in his belief of the world's contours. If he had never come back some folks might have smirked, while others might have said, "Nothing ventured, nothing gained."

We have all met people who, once having formed a good opinion, are loath to change it. Such folks enlist themselves with a vanishing generation. They are no wiser today than they were yesterday and become less sure of themselves as time goes on.

There is another class of people who are a great trial to their employers: Those who maintain an opinion, right or wrong, because it is theirs. They are arguers and you can do nothing with them as arguing never convinces them. They are unaware that "A wise man alters his opinions—a fool never."

Hetty Stone argued herself right out of a good position on the toll board at Crystal City. She argued her right-of-way over a toll circuit, never giving-in an inch. She argued with her tributaries about overtime charges, and she argued with her customers. Sometimes Hetty was right, but right or wrong she always won her point, with the last word. Is it a wonder that she was thoroughly disliked?

MORAL: "A confident expectation that no argument will be adduced that will change our opinions, is very different from a resolution that none ever shall. We may print but not stereotype our opinions."—Whately.

Forced ventilation from the outside by means of ventilating fans using spun glass filters is very effective in keeping out dirt, because it builds up a pressure in the equipment room so that dirt does not have a tendency to come in through the cracks around the windows or through the doors if they are opened.

Another item under the control of all of us in connection with new dirt is the use of lintless dust cloths which should be very strictly adhered to. The type of clothing that the central office people wear is also important. Keep down the amount of traffic by other employes in the equipment rooms and use vacuum sweepers in the equipment quarters for cleaning floors rather than the straw broom or the push broom.

Another item which falls in the classification of dirt is wire clippings from the central office frame, and they are a continual source of real trouble. A good way to eliminate this is to get a small piece of canvas about 3 ft. by 5 ft. and place sticks on either end.

If the frameman is doing considerable work on the frame, have him put this piece of canvas over the terminal lugs below him in order that pieces of solder and wire clippings will either be caught in the canvas or fall to the floor where they may be picked up easily. When not in use, the canvas may be rolled up on the sticks and put away in a cabinet. It should not be left lying or hanging on the frames.

In connection with our routines and tests, we will consider some of the items which these tests reveal. The wear of switchboard jacks and plugs may be detected by the use of gauges. When they do not meet the gauge test, they should be replaced. At least an annual inspection and test should be made of switchboard jacks, and the replacement of worn sleeves should be made as found.

In the case of switchboard plugs, they should be gauged each time a cord is cut back and cleaned at the same time. The tip and ring tension of jacks should also be tested periodically; a visual inspection will generally tell whether they are worn to an excessive amount or not.

If this practice is followed, the cleaning of switchboard plugs can be extended to a longer period. In some cases, it has not been necessary to clean plugs under one year. However, it must be remembered that the items previously mentioned, such as spring tension of jacks, were taken care of. Of course, it is also necessary to clean plugs on a position of switchboard which has been idle for some time, prior to placing it into service.

On the question of relay adjustment if the relays are thoroughly cleaned and the proper mechanical adjustments are made, relays normally should not cause very much trouble, providing you keep away from them with gas pliers.

Again the question of the outside repairman versus the inside man comes up. Earlier it was mentioned that the outside man tried to find trouble that was inside the central office. It might be added that it is also possible for the inside man to adjust his equipment to take care of faults in the outside plant. There is one thing to remember in the event that it is necessary to adjust a relay because of some possible defect, and that is to first thoroughly clean it before any adjustment whatsoever is attempted.

In dial offices the same cleaning and mechanical operations apply to dial switches with the use of a noncorrosive lubricant as applies to manual equipment. The jacks on a switch should be cleaned and adjusted each time a switch is removed from the shelf, and this is one point which is sometimes overlooked.

Bank cleaning can only be determined by the amount of dirt experienced in the particular locality in which the equipment is located. I might say that normally once a year is sufficient, provided the wipers are in good condition and the dirt is controlled insofar as practicable.

If each of you will make a visual inspection of your own equipment quarters from this old dirt and new dirt viewpoint and the set-up and frequency of your routines, you are certain to see a number of points which can be bettered and without a great amount of cost. You will also find that the dividends in service will be much greater than the cost.

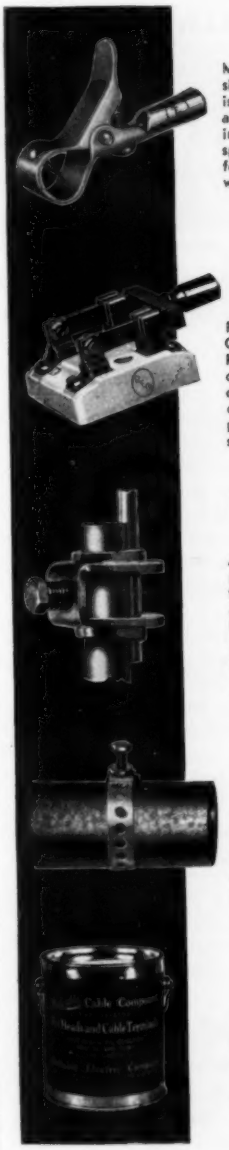
▼ ▼

Canadian Bell Long Distance Traffic Increase

Long-distance traffic of the Bell Telephone Co. of Canada in the first ten days of September in the largest cities in Quebec and Ontario showed increases of from 19 to 47 per cent.

Company officials attributed the sharp jump in business to a variety of factors directly or indirectly owing to the outbreak of war in Europe. Of the increase, 45.4 per cent originated in Ottawa between September 1 and 9, inclusive.

"RELIABLE" TELEPHONE SPECIALTIES



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Made of heavy nickel silver with perfect registering teeth. Available with hard, sharp insulation puncturing spike or without spike for temporary bare wire connections.

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Rated at 25 amperes. One-piece construction. Rugged, heavy and compact in design with double loop positive contact posts. Hinge posts equipped with spring washers.

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For sealing cable terminals perfectly without pre-heating the terminal. "Cold Flows" slightly at all temperatures. Non-shrinking; will not crack.

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Drive hooks; aerial and underground cable pulling grips; cable splicers fibre test boards; fuse blocks; mica fuses; socket wrenches; etc.

"RELIABLE" IDENTIFIES THE QUALITY

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

Essential Qualifications of a Telephone Operator

By MRS. ALLIE HUEY
Chief Operator, Gulf States Telephone Co., Gatesville, Texas

***ALTHOUGH SHE MAY** readily grasp and understand the mechanical functions of operating routines, unless the operator possesses good judgment, discretion, patience, tact and a strong spirit of cooperation she will not be qualified to give the type of service desired by the customer. Address presented before traffic conference during Texas convention*

THE WORK of a telephone operator can safely be said to be one of the most important of any vocation and she should be made to *feel* that when she enters the service. The operator plays such an essential part in the service because she is in continuous contact with the public.

One of the first things we should do with a new girl is to assist her in overcoming any fear or timidity she may feel at the start, as there is something about telephone work that seems to frighten a new girl. If she is not made to feel at ease she will not progress in the work.

The individual operator should be coached in developing a manner of dealing with customers which is natural and pleasant and one which indicates a willingness to listen and a desire to be helpful, thereby reflecting a personal interest in the customers' service.

The new employe should have close supervision, but we should be careful to interfere with the handling of the work as little as possible. We should build up the operator's confidence by commenting on features of her work she is doing well, but should also tell her of the items of her work that should be improved.

Usually an operator, with about three weeks' training, can operate with an average rate of speed but it takes from six months to one year to reach the maximum of efficiency —and she still has lots to learn.

She should at all times concentrate on the job before her. Operators in offices the size of most of those represented at our state convention must be able to handle several calls at the same time, very often both local and toll. In other words, an operator must have the ability to serve several customers at the same time in such a way that each customer will feel that he is the only one demanding her attention.

Every operator has her problems, some large, some small. A customer sometimes becomes impatient or is unreasonable and must be tactfully handled. This and many other problems must be solved; therefore, an operator must use good judgment and discretion or, we might say, common sense. Combined with the use of standard operating practices, it will result in the kind of service a customer desires.

Voice Invisible Creator of Public Good Will

One of the most essential qualifications of an operator is the "voice with a smile." The voice is the invisible creator of public good will. It influences the customer to judge the service and character of the company. Certainly an operator's prime asset is an unhurried, distinct, and pleasant tone of voice.

A good operator will keep herself fully informed regarding operating practices and any revisions put into effect from time to time. She should be able to grasp easily and to remember all instructions and to apply this knowledge practically. It takes knowledge of operating practices, as well as patience, tact, and a strong spirit of cooperation if she is to succeed.

A good operator should feel it her duty to report any equipment trouble, that she may notice, to the proper authority because she certainly cannot render good service with faulty equipment.

Thorough knowledge of the proper use of equipment will help develop good operating which will advance smoothly from one step to another, such as rotating cords and carefully giving busy tests, etc. If cords are not put up correctly it will likely cause a cut-off, and we know that a cut-off is very annoying to a subscriber and a reflection on the company.

An alert operator is always an attentive one. Attention to the progression of each call is very necessary. Prompt action must be taken at any time a call encounters difficulties or fails to be completed.

An operator should at all times keep in mind that when a call is cancelled it means (1) that a customer has been disappointed and (2) loss of revenue to the company.

In regard to emergency calls, an operator should visualize the extent the public has come to depend on the telephone for protection. Certainly a good operator will feel that such calls must go through with the least possible delay.

All telephone users are not familiar with the company's line of procedure in handling long distance calls. Therefore, if the customer gives any indication that such is the case, the operator should voluntarily suggest the necessary information. Very often an operator can avoid cancellation by doing this.

Operator's Obligation to Company, Customers

An operator has an obligation to the company she represents, as well as to the customer whom she serves, and should consider both when handling telephone calls. Often she is asked to do something that is irregular, but when she is unable to comply with a customer's request for a particular service an explanation should be given in a tactful and kindly manner. The average person is reasonable and will accept the ex-

planation if it is given in the proper way.

A good operator will at all times, whether on or off duty, avoid conducting herself in a manner open to criticism. She should be very careful not to gossip. Regardless of where an operator has heard something, if she happens to repeat it one naturally thinks she has heard it over the telephone since the public is prone to think that a telephone employe has a good chance to know everything that goes on.

An important qualification of an operator is regularity in attendance. It is not always possible to make replacements with people of the proper experience, and since the nature of our business requires that customers be given prompt and reliable service at all times, she should feel that this particular qualification is very essential.

I do not mean to imply that an operator should report for duty when she is ill, for we all know that a sick person cannot do justice to her work, but we do feel that attendance should be protected by the employe through proper care of her health and the sacrifice of such outside interest as may interfere with regular attendance.

In conclusion, let's say that an operator should endeavor to give service as near human perfection as it is possible to make it; and if she, in all her dealings with the public, can leave it fully satisfied, she is indeed a good operator.

▼ ▼

COMING CONVENTIONS

United States Independent Telephone Association, Hotel Stevens, Chicago, October 10, 11, 12 and 13.

Independent Pioneer Telephone Association of the United States, Hotel Stevens, Chicago, October 11 and 12.

South Dakota Telephone Association, Hotel Widman, Mitchell, October 19.

Kentucky Independent Telephone Association, Hotel Lafayette, Lexington, October 23 and 24.

Canadian Independent Telephone Association, King Edward Hotel, Toronto, Ontario, October 25 and 26.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, October 26 and 27.

Virginia Independent Telephone Association, Hotel John Marshall, Richmond, October 30 and 31.

North Carolina Independent Telephone Association, Sedgefield Inn, Greensboro, November 2 and 3.

South Carolina Independent Telephone Association, November 6 and 7.

Florida Telephone Association, St. Petersburg, November 13 and 14.

Alabama Independent Telephone Association, Jefferson Davis Hotel, Montgomery, November 16 and 17.

Ohio Bell to Spend $500,000 on Changeover

By November, 1940, the Ohio Bell Telephone Co. plans to replace over 5,000 magneto-type telephones in Franklin county, Ohio, with dial automatic telephones. Under the conversion schedule, replacement will be made in the villages of Worthington, Dublin, Alton and Groveport in November.

When the change is entirely completed subscribers of the Ohio Bell in Columbus will be able to dial those of any exchange in the county and any subscriber in the county may dial Columbus without paying a toll charge. Subscribers in Galloway will be served by the Alton exchange.

According to Arthur Milburn, commercial manager for the Ohio Bell Telephone Co., the cost of the changeover, including buildings, equipment, cables and other appliances is estimated at approximately $500,000.

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Recent Prices in the Metal Markets

New York, N. Y., September 18. Quotations for delivered metals (cents per pound unless otherwise noted) are today's custom smelters prices.

Copper — electrolytic, 12; export copper, unavailable; casting, f. o. b. refinery, 12¼; lake, delivered, 12⅛. Tin —spot, Straits, 55@65, nominal. Lead —New York, 5.50@5.55; East St. Louis, 5.35. Zinc—New York, 6.64; East St. Louis, 6.25. Aluminum—virgin, 20@21. Antimony — American, 13. Platinum (dollars per ounce)—38@40.

TYPE 40 PROTECTED TERMINAL

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Prove it to yourself. Specify SANDS next time.

TYPE 40 SPECIFICATIONS

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A Missouri Manufacturer's Rock Garden

ONE OF THE unique beauty spots of Missouri is the rock garden which A. B. Chance, of the A. B. Chance Co., has constructed in the back yard of his home in Centralia. The garden is unique not only for its rare beauty but also because it is open for the public to enjoy. In 1938 approximately 8,000 persons visited the Chance gardens, and at the present rate there will be 10,000 names on the record for 1939.

Although Centralia has a population of only 2,500, the beauty of the garden is so widely known that visitors from practically every state in the Union have been attracted to the little town. In June and July visitors from Brazil, France, Mexico, England, Singapore, Italy and Honolulu recorded their names on the visitor's register.

Nearly 300 tons of colorful and widely varied species of Missouri rock were used in the construction of the arches, walks, ponds, waterfalls and bordering walls, and to provide well-designed backgrounds for the flowers. The floral part of the garden consists of nearly 700 varieties of 200 different species of plants and flowers. Included in the wide collection are 32 different types of evergreens, 46 kinds of roses, 20 varieties of lilies and 242 different members of the cacti family.

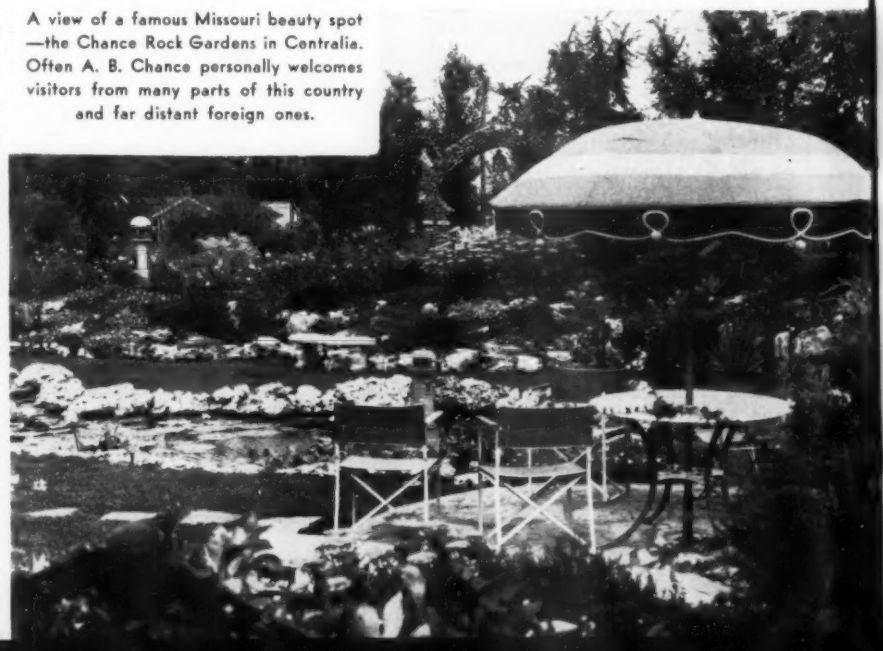
At night hundreds of well-arranged lights make the garden even more beautiful than it is in the daytime. On a cave, near a Japanese pagoda, indirect lighting brings out the full brilliance of the various colored rocks. In the cave is a miniature replica of India's famed Taj Mahal.

Another point of interest is a miniature duplication of the Egyptian island assumed to be the one where Moses was found in the bulrushes. On the island are bulrushes, the Nile flag and Egyptian lotus.

Throughout the garden's entire length and breadth are many things to catch and hold the eye of the visitor who has accepted the cordial invitation of the "Visitors Welcome" sign at the entrance. Brilliantly colored flowers, beautifully colored rocks, fragrantly scented air, rippling waterfalls and the sparkle of the goldfish all combine with the calm atmosphere to make a lasting impression upon every visitor.

The arrangement of the garden has required much time and study and throughout the year it requires much attention to keep it beautiful. Every flower and cactus is transplanted at some time during the year. During the winter many of the plants are placed in storage. Throughout the year non-blooming plants are replaced by blooming plants. However, the pleasure the garden's beauty has given to its many visitors has left Mr. Chance feeling well repaid for his many hours of work.

At night in the Chance Rock Gardens, Centralia, Mo., indirect lighting brings out the full brilliance of vari-colored Missouri rocks which form a cave inside of which is a miniature replica of India's famed Taj Mahal.



A view of a famous Missouri beauty spot —the Chance Rock Gardens in Centralia. Often A. B. Chance personally welcomes visitors from many parts of this country and far distant foreign ones.

Scientists Find Skeleton of "Telephone Pole Lizard"

Working in the valleys of the Big and Little Wichita rivers of northern Texas scientists of the Harvard-Amherst joint expedition, under direction of Dr. Alfred S. Romer of Harvard University, recently found a stem reptile, edaphosaurus—which in English means "telephone pole lizard."

"Edaphosaurus undoubtedly was as odd a creature as ever lived," related E. H. Hastings III, of Teaneck, N. J. "It had a body shaped like an alligator, a series of spines a yard long forming a kind of sail on his back and a number of cross bars on each spine. It looked like a full-rigged ship or a line of telephone poles on the march."

Commission and Court Activities

Hart Appointed Acting Head of Illinois Commission

To permit the continued functioning of the Illinois Commerce Commission in conformity with state laws, Governor Horner on September 13 appointed William W. Hart acting chairman of the commission. He succeeds Dr. Paul J. Raver, Oak Park, Ill., resignor of the chairmanship and present administrator of the Bonneville (Ore.) Dam power project.

Mr. Hart, a resident of Benton, Ill., was appointed a member of the commission in May to fill the vacancy caused by the death of Commissioner Harry Barr in 1937. For five years prior to that time he had been secretary of the commission.

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New York Telephone Co. Plans Bond Issue

A registration statement covering the issuance of $80,000,000 to $85,000,000 of the New York Telephone Co.'s new first mortgage bonds will be filed with the Securities and Exchange Commission about September 28.

Proceeds from the sale of the securities will be used to pay at maturity on November 1, $60,868,025 of 4½ per cent bonds; repay American Telephone & Telegraph Co. advances of nearly $17,600,000, and provide additional capital.

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New Subdivision Residents Protest Increase

At a hearing before the Oklahoma Corporation Commission, September 12, a few subscribers in suburban Warr Acres objected to an application of the Southwestern Bell Telephone Co., for permission to increase rates at its Bethany exchange following a proposed conversion from magneto to common battery automatic dial operation. Warr Acres is a new residential addition to Oklahoma City located near Bethany.

It developed at the hearing that a part of the addition is in the Bethany exchange area and would experience higher rates although the residents have no business through the Bethany exchange. At the suggestion of Commissioner Ray O. Weems, the attorney for Warr Acres agreed to file a petition for removal of the affected part of the subdivision to the Oklahoma City exchange district. The commission promised to consider this petition along with its consideration of the application of the Southwestern Bell Telephone Co.

Witnesses for the company testified that the proposed conversion would add $24,550 to the present $50,000 investment in the Bethany exchange. They estimated that the conversion and increased rates would convert an operating deficit at Bethany, experienced for the past eight years, to a return of $1,960 for the year 1942.

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No Competitive Bids for Securities Issues

Observing a ruling of the Pennsylvania Public Utility Commission, the Pennsylvania Telephone Corp., Erie, on August 28 submitted its issues of first mortgage bonds and preferred stock for competitive bidding. The corporation failed to receive bids from any underwriter in competition with a group already selected to market the issues.

On August 8, the Pennsylvania corporation filed a registration certificate for the security issues with the Securities and Exchange Commission. At that time it planned to make a public offering through Bonbright & Co., Inc., and Paine, Webber & Co., of New York City, and Mitchum, Tully & Co., Los Angeles, Calif. (TELEPHONY, September 2, page 33.)

The Pennsylvania Public Utility Commission on August 24 ordered that the issues be submitted for competitive bidding. Commission Secretary Joseph P. Sheridan explained the ruling did not mean that a policy of competitive bidding for telephone securities would be adopted. It was issued he stated because of the relationship existing between the Pennsylvania Telephone Corp., and its parent company, the General Telephone Corp., New York City.

The commission explained that the board of directors of the General Telephone Corp. included representatives from the three banking houses chosen to market the securities. Under the circumstances the commission felt that the issues should be subjected to

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33-J Compact Handset Type

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The Station illustrated is similar to the 23-D, but it is arranged for a handset. It includes the switchhook and hook switch springs and requires only the usual bell box and handset with associated cords. The universal mounting plate on this station allows for either shelf or wall mounting. The LD-72 signal transmitter is included as part of the standard equipment. The dimensions are — 10½" high, 6" wide, 4¼" deep; and approximate shipping weight is 20 lbs. In ordering state the type and make of handset and ringer box to be used.

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competitive bidding to see if better prices could be obtained.

In financial circles it was thought that unsettled market conditions and the previous successful handling of the securities of the General Telephone Corp. by the three selected investment firms caused other underwriters to pass up the issues.

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Increase Rates to Abide by Wage-Hour Law

The city council of Brownwood, Tex., on August 28, granted the Southwestern States Telephone Co. an increase in rates. The company had asked for the rate increase to enable it to meet operating conditions and permit increased salaries to employes.

The action will permit the company to put into effect an increase of $7,784.44 in wages and conform with the Federal Wage-Hour Law. Officials attending the hearing said the wage increases would become effective at the same time as the new rate schedule.

Additional revenue to the company from the new rates, should the present number of subscribers be maintained, would total $9,598.20. Nearly all of the difference between that sum and proposed salary increases will be absorbed by the city's new gross receipts tax of 1 per cent, which was voted on after the rate increase.

The rate changes approved by the council are: One-party business, from $4.50 to $5.50 monthly; one-party residence, from $2.50 to $2.75 and two-party residence, from $2 to $2.25.

A. G. Davidson, commercial supervisor for the company, told the council there is no doubt that the government intends to enforce the Wage-Hour Law as applied to telephone exchanges the size of Brownwood. (The Southwestern States Telephone Co. operates approximately 2,600 stations in Brownwood.) While the company does not concede that it comes under the terms of the act as yet, it proposes to put into effect the wage schedule provided under the law.

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Special Assessment Pays Costs of Utility Regulation

The Wisconsin Public Service Commission is now collecting from utilities operating in the state an assessment of $175,422.63. The charge represents costs of utility regulation incurred in the past fiscal year and not chargeable to individual cases.

Under the utility law the commission keeps record of expenses incurred in utility regulation by means of daily time cards for staff members and a detailed cost accounting system. Such costs are assessed back to the utilities.

In a utility investigation, the commission may charge costs up to four-fifths of 1 per cent of the gross intrastate revenues of the investigated utility. For general costs of utility regulation not chargeable to individual investigations the commission may make an annual remainder assessment equal to one-fifth of 1 per cent of the gross intrastate revenues of all Wisconsin utilities.

In 1938 gross revenues were $109,470,196. The maximum remainder assessment could have been $218,940 compared with the $175,000 actually assessed which was equal to about one-sixth of one per cent.

Appropriations are provided to the commission to finance costs of regulating railroads, water power developments, and motor transportation.

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Nebraska Commission Chairman to Run for Reelection

Chairman Will M. Maupin of the Nebraska State Railway Commission has filed as a candidate in the demo-

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By ARTHUR L. ALBERT
Professor of Communication Engineering, Oregon State College

Discusses the principles of electronics and the theory of vacuum tubes, photocells and copper-oxide varistors in radio and in telephone circuits. Stresses both the theory of these devices and the design and operation of circuits in which they are used. The book is non-mathematical and of practical value to those in engineering and operating branches of telephony.

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cratic primary to be held next April for reelection as a member of regulatory body.

Mr. Maupin has taken a strong stand against the arbitrary position of the federal Rural Electrification Administration that it will not pay any damage done to rural grounded telephone lines. In his statement made when he filed as a candidate he said that he believed the state has some rights that Washington is bound to respect.

"If it is best to submit to orders issued by federal bureaucrats," he said, "then change the state laws. I took an oath to uphold the constitution and the laws enacted thereunder, and where that constitution and those laws come into conflict with bureaucratic orders from Washington, I have stood true to my oath."

Mr. Maupin has shown a sympathetic attitude towards the problems of the telephone industry during his term of office, which began in 1935. In the matter of rural electrification interference he has taken the position that the law specifically gives protection to the first-comers in the field where those who come after create a condition threatening service of existing companies.

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Depression and Drouth Affect Nebraska Companies

The reports of the telephone companies in Nebraska, made to the Nebraska State Railway Commission, show how disastrously the combination of depression and drouth has affected the operations of the companies.

In 1930 there were 71,910 stations operated by companies in the A to E classes, not including the Lincoln and Northwestern Bell Telephone companies, and 2,604 stations operated by class F companies. At the close of business on December 31, 1938, the number of stations in the first classification had decreased to 47,914 and in other classification to 1,694.

In the same period the total stations served by the Lincoln Telephone & Telegraph Co. had decreased from 83,041 to 64,461, and that of the Northwestern Bell in Nebraska dropped from 116,257 to 103,802. The grand total of all corporate companies decreased from 273,812 to 217,871 stations.

Mutual companies do not report to the commission, but they have had heavy losses although furnishing service at cost. This is indicated by the fact that since 1930 the number of stations switched by the reporting companies had decreased from 26,381 to 19,093.

The greatest losses have naturally been in the rural areas. Farm subscribers of the Lincoln company have dropped from 22,895 to 11,826 and of the Northwestern Bell from 9,813 to 4,485. The class A to E group (113 companies) had a decrease from 33,100 to 18,763, and class F (29 companies) from 1,572 to 1,003.

Business stations of the Lincoln company have decreased from 18,333 to 17,318 and for the Northwestern Bell from 37,207 to 36,031, indicating these have kept up well. The companies in the A to E classes showed a decrease from 11,086 to 9,957, and class F (all city subscribers) from 1,032 to 661.

Residence stations figures show a decrease for the Lincoln company from 41,813 to 35,317 and for the Northwestern Bell from 69,237 to 63,286. Residence stations of class A to E companies dropped from 27,724 to 19,194.

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Complaint Dismissed Concerning Service Discontinuance

The Massachusetts Department of Public Utilities has dismissed the petition of M. C. Ryan, a resident of Dorchester, Mass., against the New England Telephone & Telegraph Co., to force the latter to restore service cut off because of arrears in payment. The petitioner contended at a public hearing before the commission on April 17, 1939, that he was a subscriber to unlimited telephone service, but that on account of some unpaid bills, in addition to his regular service charges—totaling less than $2 and which were cumulative from August, 1938—his residence telephone was disconnected.

The complainant further asserted that all telephone calls made from his station were listed by those members of his family who made the calls and that the list compiled by them did not warrant the charges made by the company in the nature of additional charges.

The company disputed the accuracy of the records as kept by members of the petitioner's household and maintained that the mechanical meters used by the company in determining calls were accurate and that tests made on Mr. Ryan's line subsequent to the disconnection of the petitioner's telephone verified the accuracy of the company's meters. Adjournment of the hearing was taken to May 3, 1939, but in the interim the petitioner declined to present any further evidence, communicating to the board by letter. Because of his refusal to offer further evidence the board dismissed the petition.

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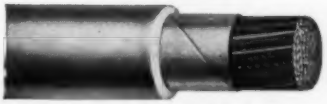

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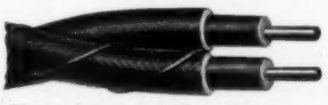

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Summary of Commission Rulings and Hearings

Federal Communications Commission

September 7: Southeast Missouri Telephone Co. filed informal request for extension of existing facilities between Cape Girardeau, Mo., and Cache, Ill.

September 16: The commission denied petition of Lorain County Radio Corp. for rehearing on application of Radiomarine Corp. of America, West Dover, Ohio, for CP for a coastal harbor station and for authority to operate under the special temporary rules governing operation of coastal harbor telephone stations in the Great Lakes region. The commission on June 20 granted special temporary authority to Radiomarine Corp. of America to operate a radiotelephone station in West Dover.

Petition of the Lorain corporation for rehearing on application of Radiomarine Corp. of America, Buffalo, N. Y., for CP for coastal harbor station and for authority to operate under special temporary rules governing the operation of coastal harbor telephone stations in the Great Lakes region, also denied.

October 9: Hearing to bring about legal determination of the FCC's authority over telephone rates where exchange areas extend over state lines. While the prepared data deals with the Southwestern Bell Telephone Co. and its extension of exchange areas across state lines of Missouri and Kansas at Kansas City and elimination of toll rates, final decision will apply to many other areas in the United States. Hearing postponed to this date from September 18 on motion of Commissioner Walker on September 11.

Idaho Public Utilities Commission

September 7: Application of Pacific Telephone & Telegraph Co. for an increase of rates in its Lewiston area denied. The increase, originally petitioned for in March 1938, would have increased the company's revenues $61,000.

Illinois Commerce Commission

September 20: Hearing in Springfield on joint application of Lola McConnell and Mason Telephone Co. for approval of contract and agreement covering sale and transfer of exchange and business of the Edgewood Telephone Exchange to the Mason Telephone Co.

September 20: Hearing in Springfield on application of Mason Telephone Co. for a certificate of convenience and necessity giving authority to operate a telephone utility in Edgewood.

September 20: Hearing in Springfield on complaint of Clarence B. Lambdin against discontinuance of service by Moweaqua Home Telephone Co.

September 20: Hearing on application of Illinois Bell Telephone Co. for a certificate of convenience and necessity granting authority to construct and operate a line for furnishing of rural service in River Oaks, West Cottage Hills, North Cottage Hills, South Cottage Hills and Fairfield subdivisions in Fosterburg township, Madison county.

September 21: Hearings in Springfield on applications of the Illinois Commercial Telephone Co. for authority to increase rates in Coulterville, Bethany, Chatsworth, Bradford, Evansville, Low Point, Washburn, Fairbury, Caberry, Campus, and Emington.

Protests have been filed by the village of Chatsworth and by Mayor Geo. Thomas of Coulterville.

Kansas Corporation Commission

October 10: Hearing on application of Western Light & Telephone Co. for authority to make certain changes in rates for service in Republic.

October 10: Hearing on Southwestern Bell Telephone Co.'s application for permission to file and put into effect a new schedule of rates in Blue Rapids.

October 12: Hearing on complaint of Clarence Rock against Larkinburg Mutual Telephone Co. for service from its Larkinburg exchange.

October 12: Hearing on application of Bloom Telephone Exchange for permission to cease operating as a telephone exchange in Bloom.

Michigan Public Service Commission

September 19: Approval given application of Michigan Bell Telephone Co. for issuance of $10,000,000 of common stock, of which all but $500,000 will be used for refunding purposes.

Purpose of the issue is to convert into common stock a portion of the company's short-term debt which has been issued to finance approximately $16,000,000 of additions to property account since 1936. This issue will bring the company's outstanding common stock to $135,000,000.

Minnesota Railroad & Warehouse Commission

September 12: Authority given Nielen Lien, Herbert Lien and Carla Lien, co-partnership, owners of the Blackduck Telephone Co. to sell, and Herbert J. Lien, to buy, all the physical properties of Blackduck Telephone Co.

North Carolina Utilities Commission

August 29: W. A. Wynne of Raleigh, representing the Pinehurst chamber of commerce, filed exceptions to a recent reduction in Pinehurst telephone rates ordered by Commissioner Stanley Winborne.

The exceptions said the rates were not sufficiently reduced.

The rate reduction order stated that four-party residential rates should be reduced from $3.50 to $2.65 a month, and four-party business rates from $5 to $4.75.

The filed exceptions to the order also charged that lines of the Central Carolina Telephone Co. gave inadequate service to the resort community. Commissioner Winborne pointed out that the company had agreed to install new automatic dial and central office equipment.

Oklahoma Corporation Commission

September 12: Hearing on application of Southwestern Bell Telephone Co. for permission to convert its Bethany exchange from magneto to automatic dial, common battery operation and increase rates. Protests were made by residents of Warr Acres, a subdivision of Oklahoma City located near Bethany.

September 20: Hearing on application of Southwest Telephone Co. to install automatic dial common battery service and to re-adjust rates in Davidson.

September 26: Hearing on complaint of B. Richardson, commission's telephone engineer, citing Southwestern Bell Telephone Co., to appear and show cause why certain territories should not be included in the initial rate area contiguous to Tulsa.

Pennsylvania Public Utility Commission

September 5: Hearing in Harrisburg on rates of the Bell Telephone Co. of Pennsylvania. Representatives of the Pennsylvania Bell company told the commission that proposed changes in "foreign exchange service" between cities and suburbs would result in an estimated $78,000 a year revenue loss to the company.

The changes were filed February 1 but the commission suspended them until September 15.

The new tariff would permit suburban subscribers to make unlimited calls to Pittsburgh and Philadelphia city limits for an additional flat toll. Some subscribers have protested the new tariff would increase rates.

Wisconsin Public Service Commission

September 22: Hearing in Madison on application of Farmers Telephone Co., Lancaster, for authority to purchase and install an automatic switchboard and aerial cable, acquire land and construct necessary housing facilities in Cassville.

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IN THE NATION'S CAPITAL

(Concluded from page 14)

a siege of hot discussion on foreign policy and narrow distinctions between "neutrality" and "impartiality."

WHAT IS breeding this controversy more than anything else is the lack of candid thinking on matters of foreign policy. Practically every step that the administration has taken, for example, has been away from a position of true impartiality and cold disinterest in the European controversy and towards aid and consolation for the allied powers.

This may reflect the overwhelming sentiment of the people of this country. But whether it does or not it is not the type of neutrality that the smaller countries of Europe, for example, adopted in the last war and have already adopted in this one. It is this latter type of neutrality which has already demonstrated its ability to survive even within earshot of the cannons' roar.

The other kind—the "strong" attitude, the doing of "anything short of war" to show "aggressors" that we are not pleased with them—is pretty much the direction which the Wilson administration finally took during our period of neutrality in 1915 and 1916. As we know, that policy was not successful—as a neutral policy.

This all comes back to what the majority of the people in the United States really want. It would be idle to question the fact that the preponderance of sympathy in the United States is in favor of the democratic powers in the European war. There may be an equal preponderance of sympathy for one side or the other in Switzerland and the Scandinavian countries, but the governments of those countries bend towards an impartial dead "center line" of official neutrality. So far our administration seems to be bending away from it.

In Holland, for instance, the government has ordered the military defenses to shoot down any foreign plane flying over its borders without authority, regardless of nationality. Can you imagine the American army shooting at a Canadian plane which took a short cut across our territory in order to bomb submarines off our New England coast? Our government does not even maintain effective diplomatic relations with Berlin. Our port treatment of German shipping has hardly been unbiased.

Again, this attitude of our administration may be what the American people wants. If so, that is the view which will prevail—this being still a truly democratic country. But if the administration has guessed wrong and if Senator Vandenberg has guessed right, we may see some very interesting political developments during this special session.

In that event the administration will be faced with the embarrassing alternative of sticking by its guns and risking a crushing defeat in November, 1940, or of hedging and crawling back off the limb with the resulting loss of much prestige. We should know more about which way the wind is blowing as the special session of Congress goes along farther.

Needless to say, the ultimate decision of the American people will have more vital and lasting effect upon American business and notably upon the utility business than any other event which can possibly happen in Washington for the next year.

For the telephone business, speaking only from the business viewpoint, it is important to remember that however much it may profit from increased business activities as the result of economic stimulation which this nation may receive during its period of neutrality, actual war can bring to the industry little more than uncertainty and danger for the continuation of profitable enterprise therein.

Answers to Traffic Questions on Page 12

1. Yes.
2. The distant operator is permitted to cut out and proceed with other work, therefore, you should ring to reach her when you are ready to pass a report.
3. One and one-half minutes.
4. Please refer to preface.
5. No. Completed calls only are subject to the federal tax.

Ohio Association to Hold Three Fall Meetings

Three fall district meetings have been scheduled by the Ohio Independent Telephone Association. They will be held in Warren, October 20; Mansfield, October 25, and Bellefontaine, November 1.

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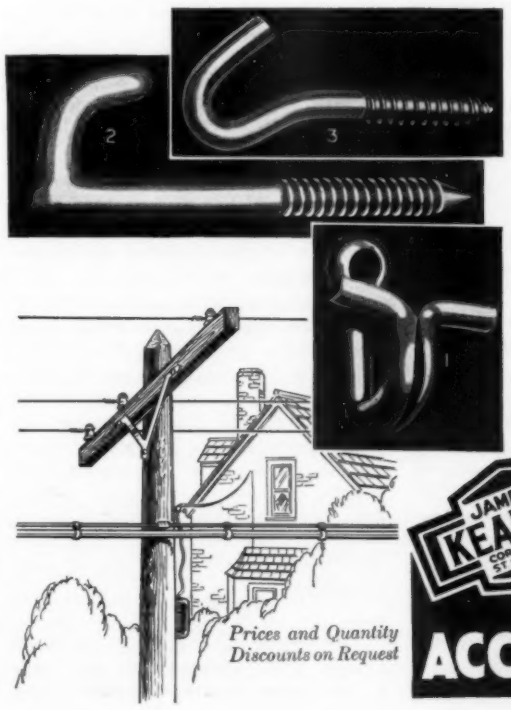

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The Manufacturers' Department

Burgess Presents New Model Acousti-Booth

Modern design and scientific acoustic construction are combined in a new Burgess acousti-booth for industrial, commercial, and public pay-station telephone users. This new booth, the manufacturer says, offers the same sound-suppressing efficiency and privacy to the user that is found in the present models now in use in hundreds of noisy factories, mills, and power houses.

New model acousti-booth designed by Burgess Battery Co.

The model 203 acousti-booth, as it is known, is made of plywood with walnut-finished exterior. The interior is of natural plywood with a perforated pattern that allows the noise to disappear into the sound-suppressing inner wall. This construction, applied to the ceiling as well as the walls, is said to absorb the noise instead of attempting to "block it out" with a door. The open construction also permits ventilation and sanitation.

Alfonso Iannelli, noted industrial designer, created the new model booth for the Burgess Battery Co., acoustic division, Dept. NR, 500 W. Huron Street, Chicago, Ill. An illustrated booklet with prices has been prepared and is available to those who may be interested.

▼ ▼

Acme Visible Records, Inc., Buys G. F. Super-Visible

Acme Visible Records, Inc. of Chicago has purchased the Super-Visible card record system division of the General Fireproofing Co. of Youngstown, Ohio. Super-Visible was introduced about a year ago after five years of intensive research and development. Due to unique construction features it has already proved itself highly advantageous for many large volume record users.

With more than 25 years of successful service in this field, Acme is now offering this new Super-Visible card record system through its organization of visible record specialists, in addition to its regular lines.

Among the unusual features of Super-Visible is the fact that it is housed in letter type file cabinets which have drawer fronts that swing forward, thus increasing the visibility of each card panel. The cards are held on removable panels which are placed in file drawers in much the same manner as letter folders. This results in extremely compact records, many thousands being held in a single vertical filing unit.

The removal and replacing of cards singly or in groups can be done very quickly due to ingenious devices for handling. The low cost per card is of great interest to record users.

▼ ▼

National Telephone Supply Co.'s New Sales Representative

The National Telephone Supply Co., Cleveland, Ohio, has announced the appointment of Robert H. Welf as special sales representative. Working out of the Cleveland office, he will contact customers and prospects in the company's northeastern territory.

By training and experience Mr. Welf is well prepared for his new assignment. He is a graduate of the Case School of Applied Science, Cleveland and is a member of the A.I.E.E. He was formerly associated with the Ohio Power Co.

▼ ▼

Telephone Literature Recently Issued

Seymour Smith & Son, Inc., Oakville, Conn., recently issued a new catalog page which describes the features and illustrates the demountable construction of the Seymour Smith telephone ranging rod No. 15.

Designed for all surveying work the eight-foot ranging rod is made of selected Sitka spruce (airplane weight wood) and, although unusually light is claimed to be exceptionally strong. The rod consists of two four-foot sections which are easily assembled for use by means of a telescoping brass tubular joint, spring catch and locking pin. The sections are colorfully finished with two coats of red and white waterproof enamel which provide clear visibility.

* *

Templeton, Kenly & Co., 1021 South Central Ave., Chicago, Ill., has issued a four-page illustrated folder which completely describes the Simplex Util-A-Tool.

The Util-A-Tool has many diversified uses, among which are: Pulling posts and poles; pushing heavy machinery; spreading structures, members, forms, partitions and equipment; bending conduit, pipe and other metallic tubes; clamping structures or members for bolting riveting or welding; and many others which it can perform in production, construction and maintenance work.

Besides its many uses the Util-A-Tool serves as a dependable ten-ton jack that will lift trucks, machinery and other heavy equipment.

ROBERT H. WELF has been named special sales representative by the National Telephone Supply Co., working out of the Cleveland, Ohio, headquarters office.

▼ ▼

Graybar Makes Organization Changes in General Department

The Graybar Electric Co., New York, N. Y., has announced several changes in its general sales department following a realignment of assignments.

E. A. Hawkins becomes general sales manager; G. F. Hessler, assistant general sales manager; D. C. Guest, sales manager of outside construction department; L. W. Taylor, assistant sales manager of outside construction department, Chicago; J. A. Mayer, supply sales manager.

D. H. O'Brien, general merchandising manager; R. C. Litchfield and

G. A. Antrim, assistant general merchandising managers; G. K. Heyer, general telephone and power apparatus sales manager; A. J. Eaves, research products sales manager; L. D. Gore, sales manager of hearing aids department; G. L. Donnett, research products sales engineer; E. J. Dailey, power apparatus sales manager; C. S. Powell, telephone sales manager; J. B. Long, telephone sales engineer; A. E. Hetzner, signaling sales manager.

H. Metz, general lamp and lighting sales manager; R. C. Kinney, lighting sales manager; K. B. Hopkins, advertising manager; Mildred A. Nichols, director of the home economics department; J. H. Gardiner, sales statistician; and W. R. Wheeler, traffic manager.

▼ ▼

Synthetic Solid Produces Unusual Tracing Paper

An entirely new type of tracing paper combining the transparency of oil-treated sheets with the permanence of natural 100 per cent rag papers is a recent development of the Keuffel & Esser Co., of Hoboken, N. J. The new paper is named Albanene.

It is made of 100 per cent long fiber clean white rags, and it is treated with a new crystal clear synthetic solid called Albanite, developed in the K&E Laboratories. Because this new transparentizing agent is free from oil and wax and both chemically and physically inert, it is claimed that Albanene will not oxidize, turn yellow, become brittle, or lose transparency with age.

According to the manufacturer, the new chemical has remarkable penetrating power so that an extremely long fiber base paper can be used, giving Albanene an unusually high strength factor by all standard paper tests. The ability of Albanite to penetrate "wild" fibers gives the paper unprecedented transparency and superior blue-printing quality, the manufacturer states.

It is further claimed that the use of this new type transparentizing agent permits a fine-toothed, smooth drawing surface that takes strong pencil lines with a minimum wear on the point. It is also said to be extremely easy to make erasures or corrections.

Albanene is offered in three weights —light, medium, and heavy. An illustrated brochure and a generous working sample of this new paper can be secured by writing to the manufacturer.

▼ ▼

Direct Overseas Service to European Countries

The American Telephone & Telegraph Co. opened direct radiotelephone service to Italy on September 11. The opening of this service was scheduled for later in the month but was advanced because of conditions in Europe. Initially, the service will enable all Bell System and Bell-connected telephones in this country to reach telephone subscribers in Italy.

Service was resumed with The Netherlands, Hungary and Switzerland September 12 and calls were passed that day to a number of Holland cities including Rotterdam, Amsterdam, Haarlem and Gravenhagen.

On September 13 radiotelephone service was resumed with Belgium, Denmark, Germany, Lithuania, Bulgaria and Jugo-Slavia.

During the first two days, conversations passed between the United States and several Italian cities including Rome, Milan, Naples, Genoa and Florence.

Radiotelephone service with Italy is handled by the A. T. & T. Co. through its short-wave radiotelephone stations in New Jersey. The Bell System stations will work with radiotelephone stations of the Italo Radio Co. near Rome, connecting there with the telephone network of the Italian Telephone Administration.

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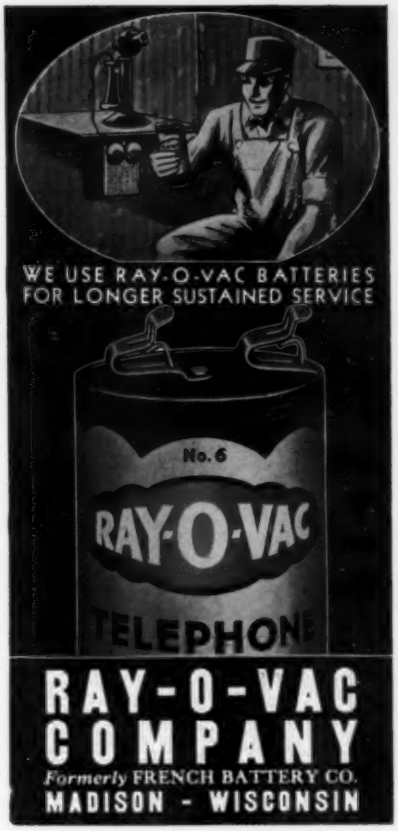
MacGillis & Gibbs Company, Milwaukee, Wis.—Northern White and Western Red Cedar Poles. Plain or butt-treated. Immediate quotations on request.

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.

Western Red Cedar Company, P. O. Box 663, Sandpoint, Idaho.—Plain or butt treated Western Red Cedar poles.



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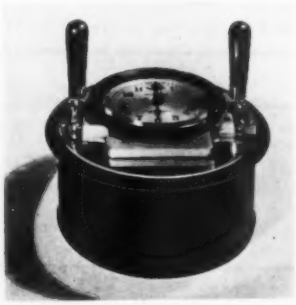

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